Amendments to the Specification:

Please replace the paragraph on page 1, lines 1-3 with the following amended paragraph:

The ~~invention~~ application relates to a method for magnetic resonance imaging of at least a portion of a body placed in a stationary and substantially homogeneous main magnetic field, the method comprising the following steps:

Please replace the paragraph on page 1, lines 11 and 12 with the following amended paragraph:

Furthermore, the ~~invention~~ application relates to a device for magnetic resonance imaging for carrying out this method.

Please replace the paragraph on page 2, lines 16-18 with the following amended paragraph:

The above-mentioned 2D RF pulses ~~consist of~~ include shaped RF pulses which are irradiated in combination with fast magnetic field gradient switching. It has been shown, that this technique facilitates the excitation of arbitrarily shaped profiles in two dimensions.

Please replace the paragraph on page 3, lines 16-20 with the following amended paragraph:

Therefore, it is readily appreciated that there is a need for an MRI method which enables T2-contrast enhanced imaging without limiting the quality of the MR navigator signal. ~~It is consequently the primary object of the present invention to provide a method for T2-weighted imaging, which gives a high T2 contrast and also guarantees a faultless functioning of the navigator.~~

Please replace the paragraph on page 3, lines 21-24 with the following amended paragraph:

In accordance with ~~the present invention~~ one aspect, a method for magnetic resonance imaging of the type specified above is disclosed, wherein the aforementioned object is achieved by subjecting the portion of the body to a 2D navigator restore sequence prior to subjecting the portion to the 2D navigator sequence ~~in step b)~~.

Please replace the paragraph on page 3, lines 25-33 and page 4, lines 1 and 2 with the following amended paragraph:

The present ~~invention~~ application enables to perform fast tomographic scanning with enhanced T2 contrast. While the method ~~of the invention~~ is ~~particularly~~ valuable for MRA, it can also be applied to any navigator based imaging technique. The structure of the imaging procedure is similar to the above-described ~~known~~ method. But the essential difference is the application of the 2D navigator restore sequence, which is generated prior to the actual 2D navigator sequence. The 2D navigator restore sequence ~~of the invention~~ comprises RF pulses and magnetic field gradient pulses, which are selected such that the effect the T_2- preparation sequence has on the MR navigator signal is largely compensated for. This compensation can effectively be performed, because with the 2D navigator restore sequence it is possible to selectively manipulate nuclear magnetization in the particular restricted volume, which is subsequently sampled by the 2D navigator sequence ~~in the above described known fashion~~.

Please replace the paragraph on page 4, lines 3-14 with the following amended paragraph:

The application of a 2D navigator restore sequence is known in a different context from a publication by Stuber (M. Stuber et al., „Three- Dimensional High-Resolution Fast Spin-Echo Coronary Magnetic Resonance Angiography", Magnetic Resonance in Medicine, volume 45, pages 206-211, 2001). But in contrast to the

present ~~invention~~ application, this known publication is dealing with the ~~so-calles~~ so-called black blood technique, in which an initial RF pulse for non- selective inversion of the nuclear magnetization is followed by a selective inversion pulse for re-inversion of the magnetization. After the initial pulse, there is an inversion delay to facilitate signal-pulling of the in-flowing blood at the region of interest. According to the above publication, a 2D navigator restore sequence is implemented, which locally reinverts (i.e. restores) the longitudinal magnetization at the position of the navigator. This ~~known~~ method does obviously not enable T_2-weighted imaging with a high T_2 contrast and with a well-functioning navigator~~, as it is the object of the present invention~~.

Please replace the paragraph on page 4, lines 15-25 with the following amended paragraph:

~~With the method of the present invention it is practical if~~ In one embodiment, the T_2-preparation sequence comprises at least two RF pulses, which are separated by a relaxation period, for enhancing the contrast between tissues with different transverse relaxation times. With the initial RF- pulse, which is, for example, ~~preferably~~ a 90° pulse, the ~~equillibrium~~ equilibrium magnetization is transformed into transverse magnetization. Only magnetization of tissue with a long T_2 will survive the subsequent relaxation period. After the relaxation period, the remaining transverse magnetization is transformed back into longitudinal magnetization by the so-called „tip-up" RF pulse of the T_2-preparation sequence, which ~~again preferably~~ for example has a flip angle of 90°. It is also possible that the T_2-preparation sequence further comprises an even number of substantially 180° RF pulses, thereby avoiding preliminary loss of transverse magnetization because of local inhomogeneities of the main magnetic field.

Please replace the paragraph on page 4, lines 26-34 and page 5, lines 1-7 with the following amended paragraph:

A 2D navigator sequence, which comprises at least two shaped RF pulses and at least one gradient pulse being switched during irradiation of said shaped RF pulse, ~~is well suited for application according to the method of the invention in order~~ to enable the excitation of nuclear magnetization within a spatially restricted navigator volume. In this way, the 2D navigator restore sequence can be applied during the relaxation period of the T_2-preparation sequence for selectively transforming transverse magnetization within the navigator volume into longitudinal magnetization. This ~~procedures~~ procedure enables the simultaneous application of the T_2- preparation sequence and the 2D navigator sequence, which is particularly advantageous regarding the speed of the imaging procedure. No additional time is needed for the 2D navigator restore sequence by integrating it into the T_2-preparation sequence. In practice, the transverse magnetization, which is generated by the initial RF pulse of the T_2-preparation sequence, is immediately transformed back into longitudinal magnetization by the 2D navigator restore sequence. At the end of the relaxation period, this longitudinal magnetization is again transformed into transverse magnetization such that it can be restored into longitudinal magnetization by the non-selective tip-up pulse of the T_2-preparation sequence.

Please replace the paragraph on page 5, lines 8-12 with the following amended paragraph:

In ~~practice~~ one embodiment, the MR navigator signal ~~of the present invention~~ can advantageously be employed for gating of the imaging sequence and/or for adjusting the parameters of said imaging sequence and/or for correction of said MR image. Regarding the image quality, good results are obtained if both gating and adaptive motion correction of the imaged volume (so-called slice-tracking) are performed.

Please replace the paragraph on page 5, lines 13-15 with the following amended paragraph:

In ~~terms of imaging speed~~ one embodiment, ~~it is particularly useful if~~ the imaging sequence ~~of the method of the invention~~ is a turbo field echo (TEE) sequence~~. It turns out in practice that good results are obtained with~~, for example, a 3D TFE-EPI sequence with partial k- space acquisition.

Please replace the paragraph on page 5, lines 16-29 with the following amended paragraph:

It is easily possible to incorporate the method of the present ~~invention~~ application in a dedicated device for magnetic resonance imaging of a body placed in a stationary and substantially homogeneous main magnetic field. Such a MRI scanner comprises means for establishing the main magnetic field, means for generating gradient magnetic fields superimposed upon the main magnetic field, means for radiating RF pulses towards the body, control means for controlling the generation of the gradient magnetic fields and the RF pulses, means for receiving and sampling magnetic resonance signals generated by sequences of RF pulses and switched gradient magnetic fields, and reconstruction means for forming an image from said signal samples. In accordance with ~~the invention~~ one aspect, the control means, which is ~~usually~~, for example, a microcomputer with a memory and a program control, comprises a programming with a description of an imaging procedure according to the above-described method ~~of the invention~~. For ECG-gating of the imaging procedure, ECG-means may be provided for registering ECG-data from the body of the patient. These ECG-data may be processed by the control means of the MRI scanner.

Please replace the paragraph on page 5, lines 30-34 and page 6, lines 1-3 with the following amended paragraph:

The ~~invention~~ application further relates to a computer program ~~programme as defined in Claim 10.~~ which when ~~When~~ loaded in the computer, ~~of the MR-system~~ enables the MR-system to perform the described method ~~of the invention~~. The computer ~~programme~~ program according to the ~~invention~~ application enables the magnetic resonance imaging system to achieve the technical effects involved in

performing the magnetic resonance imaging method of the ~~invention~~ application. The computer ~~programme~~ program is loaded in the computer of micro-processor of the magnetic resonance imaging system. The computer ~~programme~~ program of the ~~invention~~ application may be provided on a data carrier such as a CD-ROM or may be made available via a data network, such as the world-wide web.

Please replace the paragraph on page 6, lines 4-12 with the following amended paragraph:

The following drawings disclose preferred embodiments of the present invention. It should be understood, however, that the drawings are designed for the purpose of illustration only and not as a definition of the limits of the invention.

~~In the drawings~~

Fig. 1 shows a diagram of a pulse sequence ~~in accordance with the present invention~~; and

Fig. 2 shows an embodiment of a MRI scanner ~~according to the invention~~.

Please replace the paragraph on page 6, lines 15-19 with the following amended paragraph:

A sequence design in accordance with the method of the present ~~invention~~ application is depicted in Fig. 1. The diagram shows the temporal succession of radio frequency pulses RF and of magnetic field gradient pulses GX, GY, GZ in three orthogonal directions. A patient placed in a stationary and substantially homogeneous main magnetic field is subjected to these pulses during the MRI procedure ~~of the invention~~.

Please replace the paragraph on page 6, lines 27-34 with the following amended paragraph:

As further shown in Fig. 1, a 2D navigator sequence NAV is applied after the sequence T2PRE. The sequence NAV comprises a 2D pulse ~~consisting of~~ including a

shaped RF pulse, during which gradients GX and GY are switched rapidly. A restricted two-dimensional spatial profile, as for example a pencil beam shaped navigator volume at the dome of the right diaphragm of the patient, is excited by these pulses. At the end of the 2D navigator sequence NAV a MR navigator signal is measured in the presence of a gradient GZ, thereby enabling the reconstruction of a one-dimensional image of the navigator volume. This image can be used to monitor the position of the patient's diaphragm during respiration.

Please replace the paragraph on page 7, lines 6-18 with the following amended paragraph:

In ~~accordance with the invention~~ one embodiment, a 2D navigator restore sequence NAVRE is applied prior to the 2D navigator sequence NAV. In Fig. 1, the sequence NAVRE is incorporated into the sequence T2PRE in order not to loose any time with the application of additional pulses. The 2D navigator restore sequence NAVRE comprises a first 2D pulse, which is irradiated immediately after the first α_X pulse, thereby selectively transforming the transverse magnetization of the navigator volume, which was generated by the initial RF pulse α_X, back into longitudinal magnetization. This longitudinal magnetization is not affected by transverse relaxation during the relaxation period. A second 2D pulse of the sequence NAVRE is applied just before the second pulse. The longitudinal magnetization of the navigator volume is again transformed into transverse magnetization such that it is restored into longitudinal magnetization by the second „tip-up" α_X pulse of the T_2-preparation sequence T2PRE. As a result, the nuclear magnetization of the navigator volume is virtually not disturbed by the T_2-contrast enhancing sequence T2PRE.

Please replace the paragraph on page 7, lines 19-34 and page 8, lines 1-8 with the following amended paragraph:

In Fig. 2 a magnetic resonance imaging device 1 is diagrammatically shown. The apparatus 1 comprises a set of main magnetic coils 2 for generating a stationary and homogeneous main magnetic field and three sets of gradient coils 3, 4 and 5 for

superimposing additional magnetic fields with controllable strength and having a gradient in a selected direction. Conventionally, the direction of the main magnetic field is ~~labelled~~ labeled the z- direction, the two directions perpendicular thereto the x- and y-directions. The gradient coils are energized via a power supply 11. The apparatus 1 further comprises a radiation emitter 6, an antenna or coil, for emitting radio frequency (RF) pulses to a body 7, the radiation emitter 6 being coupled to a modulator 8 for generating and modulating the RF pulses. Also provided is a receiver for receiving the MR-signals, the receiver can be identical to the emitter 6 or be separate. If the emitter and receiver are physically the same antenna or coil as 30 shown in Fig.2, a send-receive switch 9 is arranged to separate the received signals from the pulses to be emitted. The received MR-signals are input to a demodulator 10. The modulator 8, the emitter 6 and the power supply 11 for the gradient coils 3, 4 and 5 are controlled by a control system 12 to generate the above-described sequence of RF pulses and a corresponding sequence of magnetic field gradient pulses. The control system ~~is usually~~ can be a microcomputer with a memory and a program control. For ~~the practical implementation of the invention~~ example, it comprises a programming with a description of an imaging procedure according to the above-described method. The demodulator 10 is coupled to a data processing unit 14, for example a computer, for transformation of the received echo signals into an image that can be made visible, for example on a visual display unit 15. There is an input means 16, e.g. an appropriate keyboard, connected to the control system 12, which enables an operator of the device to interactively adjust the parameters of the imaging procedure.